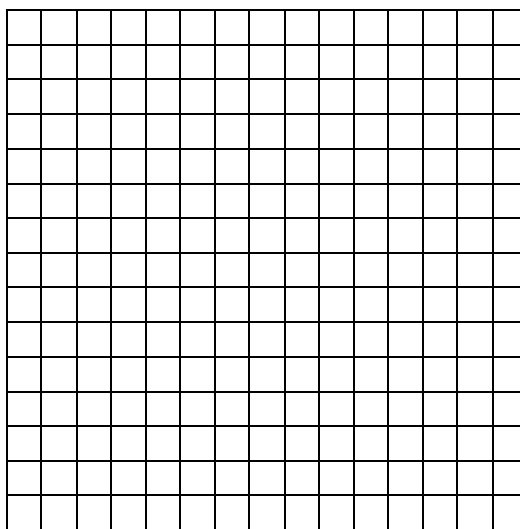
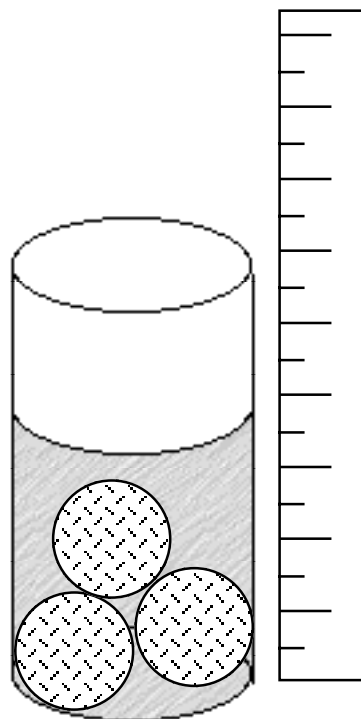


Student Activity 3: Going to Great Depths

What is the relationship between the number of uniform objects added to the cylinder and the height of the water in the cylinder?

Add uniform objects to the cylinder. Measure the height of the water with each additional object.

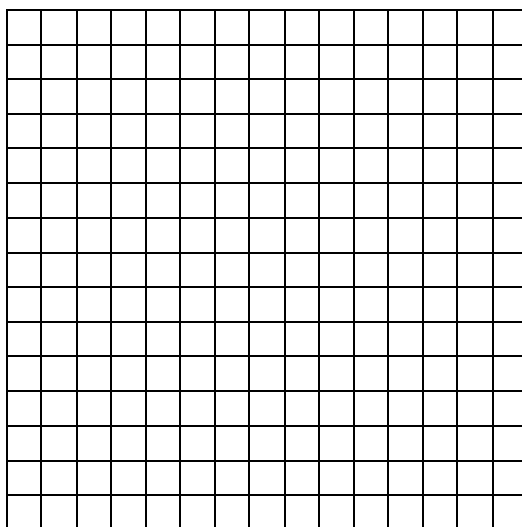
1. Sketch a graph predicting the relationship between the height of the water and the number of objects added:



2. Data Collection

Number of Objects	Height (cm)

3. Make a scatter plot using a graphing calculator. Sketch below.



4. Use first differences to estimate a rate of change.
5. Estimate the y -intercept (*starting point*.)
6. Find a trend line for the data using the estimated rate and y -intercept.
7. Graph your trend line over the scatter plot and adjust the parameters y -intercept and *rate of change*, if necessary, for a better fit.
8. What are the units of slope for the trend line?
9. What is the meaning of the y -intercept in the trend line?
10. Use your trend line to determine how high the water would rise with 9 objects in the cylinder. Write the equation and solve in at least three ways.

11. Use your trend line to determine how many objects are needed to make the water rise 6 cm higher than the highest water level recorded (assuming the container could hold that much water.) Write the equation and solve in at least four ways.
12. Make a general statement about the relationship between the number of uniform objects and the height of the water.
13. Suppose you used larger objects. Predict how the graph would change.
14. Suppose you used a cylinder whose diameter is half that of the original cylinder. Predict how the graph would change.

Sample Assessment

A group collected the following data for Going to Great Depths.

Number of Objects	Height (cm)
0	15
1	16.1
2	17
3	18.2
4	19

1. Create a scatter plot and find a trend line. Sketch both in an appropriate window.
2. Use a table on a graphing calculator to determine how high the water level would be with 10 added objects. Show how you found your answer.
3. Use the table on a graphing calculator to determine how many objects were added if the water level is 45 cm, (assuming the container is tall enough.) Show how you found your answer.